

# TAXONOMIC COMPOSITION AND DISTRIBUTION OF *BRACHIONUS* (ROTATORIA: MONOGONONTA) POPULATIONS IN PONDS<sup>1</sup>

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(With twelve text-figures)

The different species and varieties constituting the *Brachionus* population of four freshwater fish-ponds at Tuticorin, south India, were identified and their numerical abundance and frequency of occurrence studied over a period of 19 weeks. Nine varieties belonging to seven species of *Brachionus* were identified. The identified taxa were compared and contrasted with those reported from other parts of India. *B. calyciflorus* var. *anuaeriformis*, *B. plicatilis* and *B. angularis* var. *angularis* dominated the populations during most of the investigation period. The other species and varieties occurred occasionally or rarely.

## INTRODUCTION

Rotifers in general, and *Brachionus* in particular, form an important constituent of zooplankton biomass of freshwater fish ponds. Their importance as food or in the food chain of fish is often emphasised (Jyoti and Sehgal 1979).

However, studies on this group in fish ponds are limited, although several works have been carried out in natural waters of the northern part of India (George 1961, Jyoti and Sehgal 1979, Nasar 1973, Pasha 1961, Sharma 1976, 1979, 1980, 1981, 1983) and some in the southern part of India (Dhanapathi 1974, Naidu 1967, Nayar and Nair 1969, Pasha 1961). Such studies in south Tamil Nadu are almost absent. In the present study the species and varietal composition of the genus *Brachionus* of fish ponds and their weekly distribution are dealt with.

## MATERIAL AND METHODS

Four freshwater fish culture ponds located in the premises of Fisheries College, Tuticorin (Tamil Nadu) were selected for the present study. The man-made earthen ponds were under semi-intensive carp culture. Weekly plankton samples were collected using a plankton net of 60 µm mesh size over a period of 19 weeks from 8 November 1986 to 13 March 1987. The samples were preserved in 5% formalin prior to microscopic identification, measurement and enumeration.

## RESULTS AND DISCUSSION

During the study, a total of ten taxa (nine varieties belonging to seven species) were identified from the four ponds. The species are discussed in order of decreasing abundance. Table 1 gives the measurements of the taxa. The weekly variations in the numerical abundances of the taxa are presented in Fig. 12.

### 1. *Brachionus calyciflorus*

This species was represented by three varieties. Sharma (1979), however, preferred to place the three as 'formae' and refrained from calling them 'varieties'.

(i) *B. calyciflorus* v. *anuaeriformis* Brehm, 1909: Antero-dorsal (occipital) margin of lorica with four long and equal spines. Postero-lateral spines long, slender and diverging. Two caudal spines shorter (Fig. 1). The form is identical with that reported from Punjab (Vasisht and Battish 1971).

This variety was one of the two taxa occurring throughout the period of study except in the sample of 8 November 1986. Swarming of the variety was noticed whenever the dissolved oxygen in water was high (above 5.0 ppm).

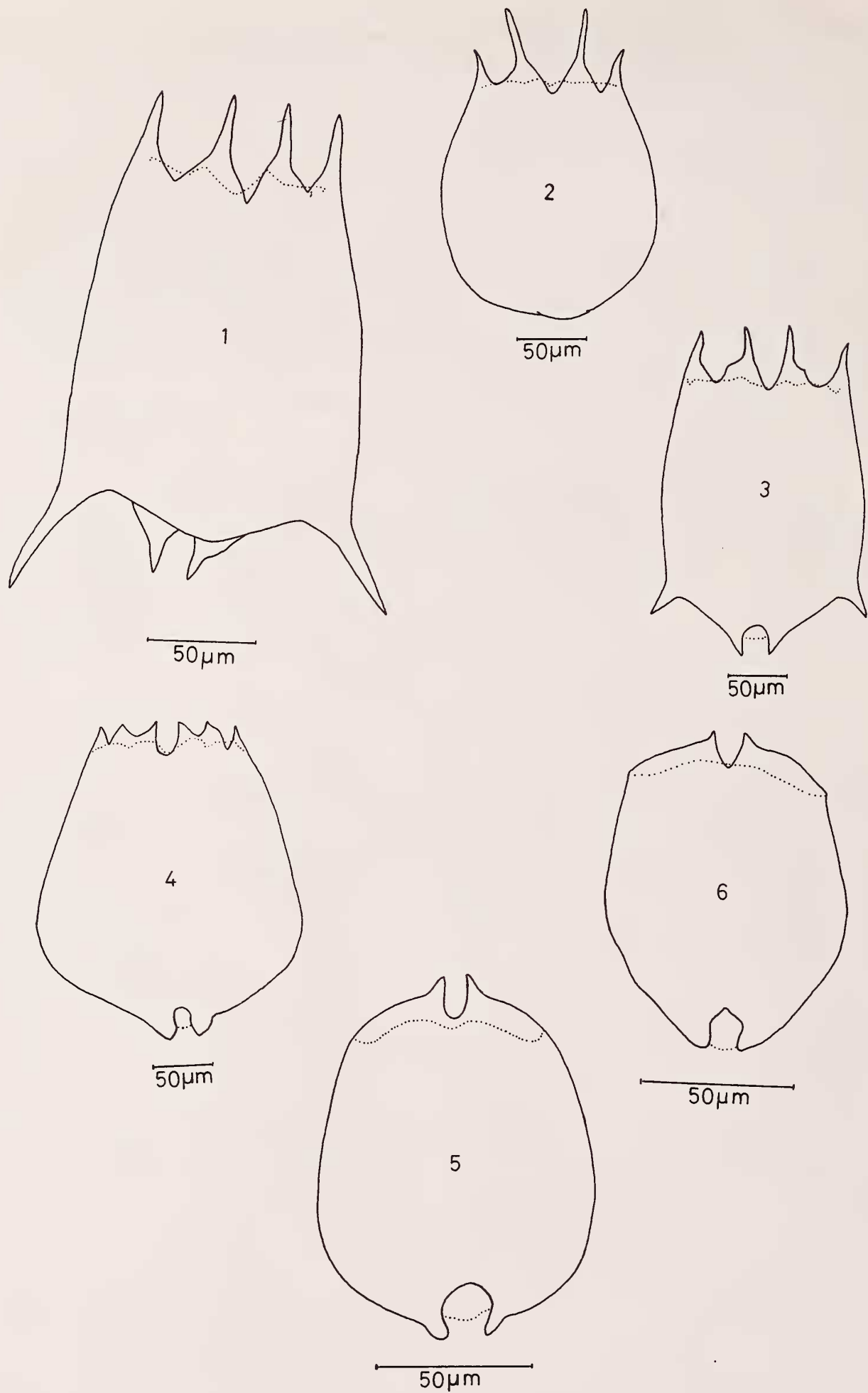
(ii) *B. calyciflorus* v. *dorcas* Gosse, 1851: Lorica rounded and highly stippled. Occipital margin with four spines of which medians twice as long. Base of medians wide (Fig. 2).

This variety occurred less frequently and less abundantly than *B. calyciflorus anuaeriformis*.

(iii) *B. calyciflorus* v. *hymani* Dhanapathi, 1974: Occipital margin of the lorica with four wide-

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Figs. 1-6. *Brachionus* spp.

1. *Brachionus calyciflorus* v. *anuaeriformis*, 2. *B. calyciflorus* v. *dorcasi*, 3. *B. calyciflorus* v. *hymani*, 4. *B. plicatilis*,  
5. *B. angularis* v. *angularis*, 6. *B. angularis* v. *bidens*.

based spines of which the laterals slightly shorter. Outer base of the medians bearing a tooth-like projection. Antero-ventral spines flanking the median sinus and less prominent in contrast to the form reported from West Bengal (Sharma 1979) (Fig. 3). Sharma. (1979) identified this taxon as *B. calyciflorus* f. *borgeti*.

This variety occurred rarely.

## 2. *Brachionus plicatilis* Muller, 1786:

Posterior of lorica broad. Occipital spines six which are short, stumpy and broad-based. Separations between medians and intermediates less distinct. Median sinus very deep and U-shaped. Antero-ventral margin wavy. Foot opening deep and flanked by tooth-like projections (Fig. 4).

This species also occurred throughout the study period (except in the sample of 19 December 1986) as *B. calyciflorus anuaeriformis*. Also, this species was the most abundant of all taxa. Swarming of the species was noticed at ponds at times of low dissolved oxygen.

## 3. *Brachionus angularis*

(i) *B. angularis* v. *angularis* Gosse, 1851: Anterior margin of the lorica characteristically rounded and slightly narrower than the posterior. Occipital spines two, short, slightly pointed and flanking the deep U-shaped median sinus. Antero-ventral margin more or less parallel to the dorsal margin, showing a shallow depression at median and curved anteriorly at corners. Foot opening flanked by two short and rounded caudal spines bent inwards (Fig. 5).

The frequency of occurrence and abundance of

this variety was high, being next to that of *B. calyciflorus anuaeriformis* and *B. plicatilis*. In most instances it co-occurred with *B. plicatilis* except during mid-December to mid-March when this variety showed a rare occurrence.

(ii) *Brachionus angularis* v. *bidens* Plate, 1886: Occipital margins of the lorica flattened. This variety differs from *B. angularis angularis* in having smaller median spines, V-shaped sinus and ventral margin being more parallel to the dorsal margin and not wavy. Caudal end of lorica somewhat tapering (Fig. 6).

This variety occurred less frequently and less abundantly than *B. angularis angularis*.

## 4. *Brachionus urceolaris* v. *urwaensis* Sudzuki, 1964

Lorica broad and bulged at middle. Dorsal and ventral plates separated. Occipital spines six. Medians slender, pointed and flanking the deep median sinus. Laterals also slender but slightly shorter and less pointed than other spines. Intermediates very broad with pointed ends. Caudal opening wide and flanked by two spine-like projections (Fig. 7).

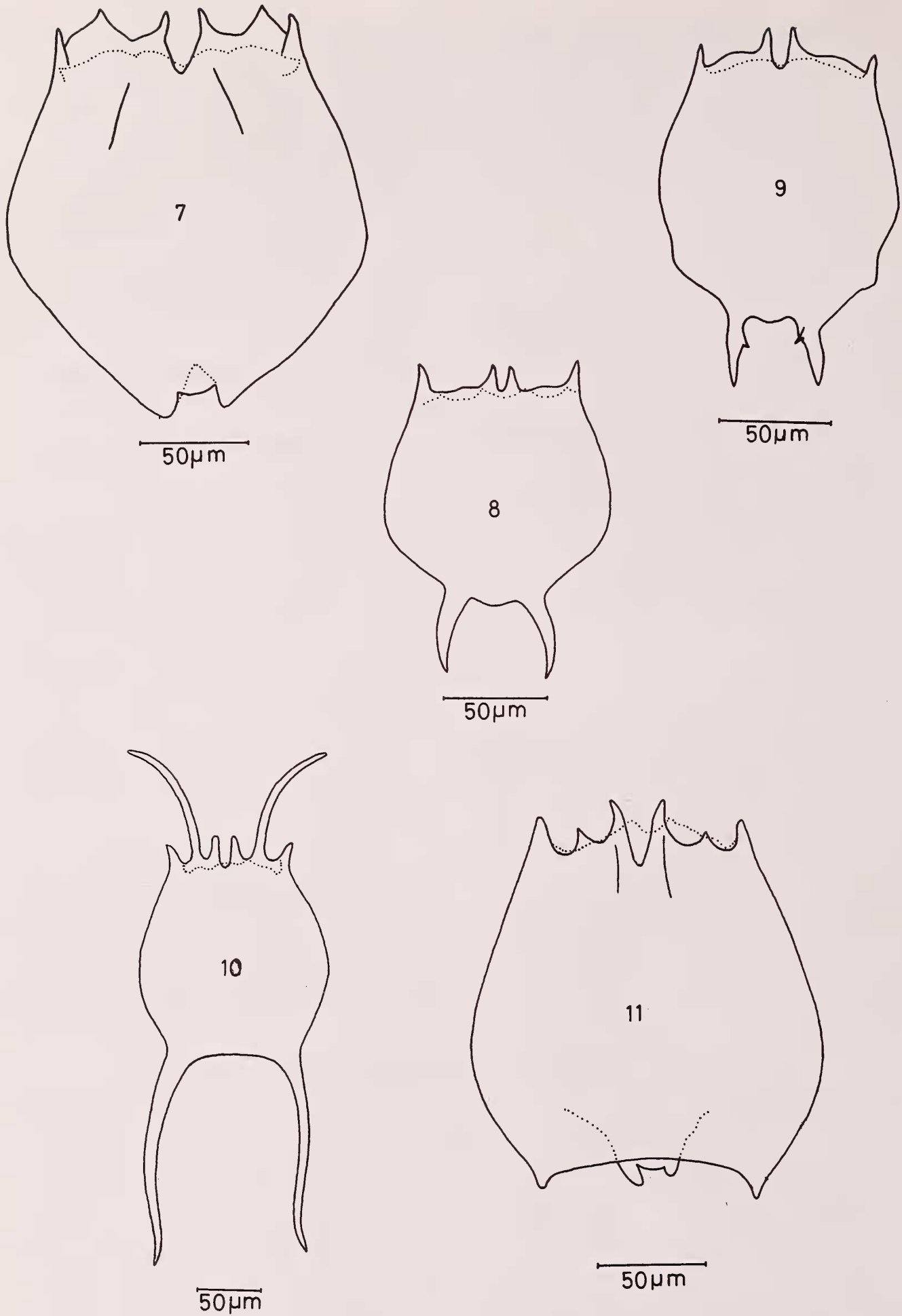
This species was rare during the study.

## 5. *Brachionus caudatus* v. *aculeatus* Hauer 1937

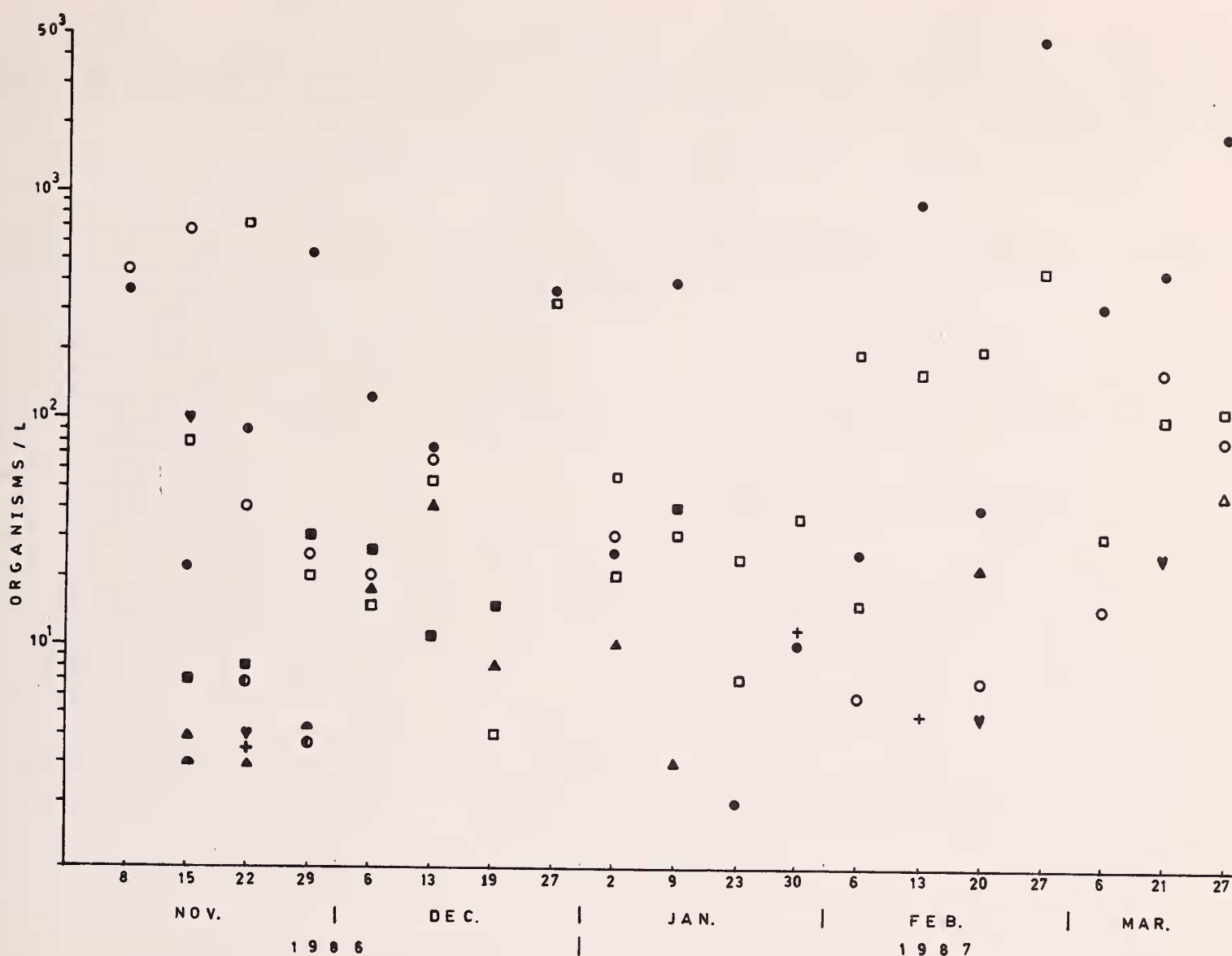
Occipital margin somewhat flat with two medians and two laterals, all short and pointed at ends. Intermediates absent. Two long caudal spines with blunt ends and curved inwards (Fig. 8). This form was identical with that reported from Andhra Pradesh (Dhanapathi 1974). Another form identical

TABLE 1  
MEASUREMENTS OF TAXA OF *Brachionus* FROM FISH PONDS AT TUTICORIN

Taxon of <i>Brachionus</i>	Total length ( $\mu\text{m}$ )	Maximum width ( $\mu\text{m}$ )
<i>B. calyciflorus anuaeriformis</i>	243	138
<i>B. calyciflorus hymani</i>	280	170
<i>B. calyciflorus dorcas</i>	217	152
<i>B. angularis angularis</i>	117	88
<i>B. angularis bidens</i>	105	80
<i>B. plicatilis</i>	260	220
<i>B. urceolaris urwaensis</i>	184	164
<i>B. caudatus aculeatus</i> (Fig. 8)	136	101
<i>B. caudatus aculeatus</i> (Fig. 9)	162	104
<i>B. falcatus lyratus</i>	450	170
<i>B. quadridentatus rhenanus</i>	180	160

Figs. 7-11. *Brachionus* spp.

7. *B. urceolaris* v. *urwaensis*, 8. & 9. *B. caudatus* v. *aculeatus*, 10. *B. falcatus* v. *lyratus*, 11. *B. quadridentatus* v. *rhenanus*.



- *Brachionus calyciflorus* v. *anuaeriformis*.
- *B. plicatilis*.
- † *B. urceolaris* v. *urwaensis*.
- △ *B. quadridentatus* v. *rhenanus*.
- *B. calyciflorus* v. *dorcas*.
- *B. angularis* v. *angularis*.
- *B. caudatus* v. *aculeatus*.
- ▽ *B. calyciflorus* v. *hymani*.
- ▲ *B. angularis* v. *bidens*.
- *B. falcatus* v. *lyratus*.

Fig. 12. Weekly variations in the numerical abundance of taxa of *Brachionus* (The values are averages of the four ponds)

with the one reported from Orissa (Sharma 1980) was also found to occur. The latter had straight posterior spines with a sharp hook-like projection at the base, a bulge at the middle and pointed ends (Fig. 9).

Both the forms of this variety occurred only twice in the study (15 and 21 November 1986).

6. *Brachionus falcatus* v. *lyratus*  
Lemmerman, 1908

Lorica with six occipital spines, all blunt. Medians straight and marginally longer than the laterals. Laterals slightly curved and pointed outwards. Intermediates seven times as long as the medians and bent outwards. Two posteriors ex-

tremely long, curved inwards but ends bent outwards. Except the relatively greater curvature of the intermediates, the form is identical with the one reported from Bihar (Nasar 1973) (Fig. 10).

This species was found to occur only twice during the study (22 and 29 November 1986).

7. *Brachionus quadridentatus* v. *rhenanus*  
Lauterborn 1893

Posterior half of lorica laterally bulged. Occipital spines six. Medians flanking deep V-shaped median sinus and bent gently outwards. Intermediates less distinct, short, broad and pointed. Laterals longer than intermediates and shorter than medians. Antero-ventral margin with two spine-like

median projections flanking a shallow sinus. Posterior margin slightly flattened bearing two short nipple-like spines at ends (Fig. 11). This form was identical with the one reported from Punjab (Shar-

ma 1981).

This taxon of *Brachionus* occurred only once during the study (21 March 1987).

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